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PROGRESS
THE NATIONAL TOOL AND DIE JOURNAL

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Special Tool, Die & Machine Shop Industry

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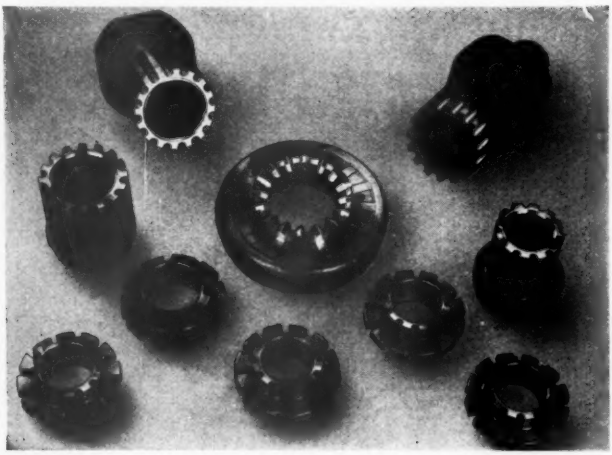

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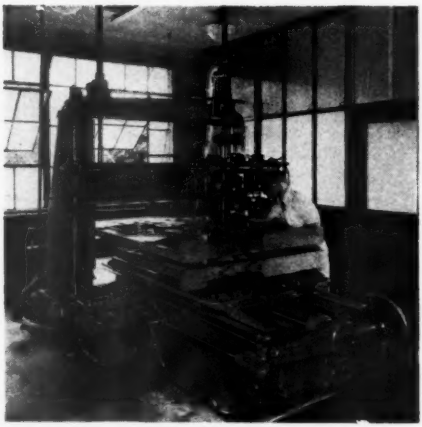

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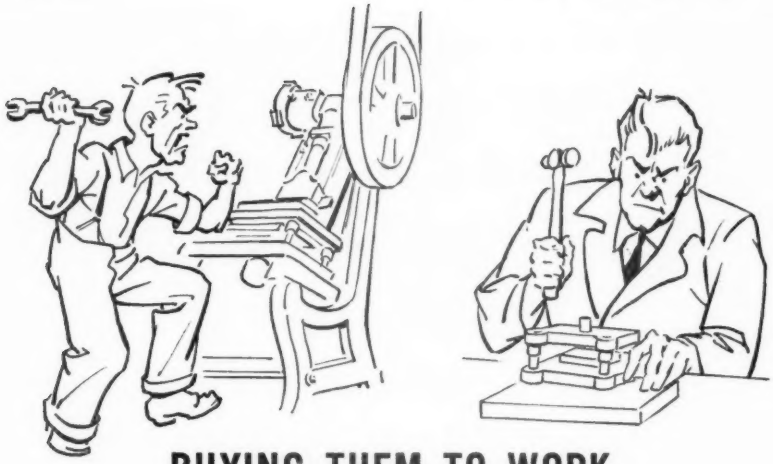

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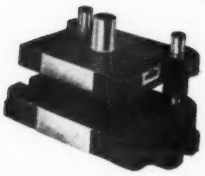

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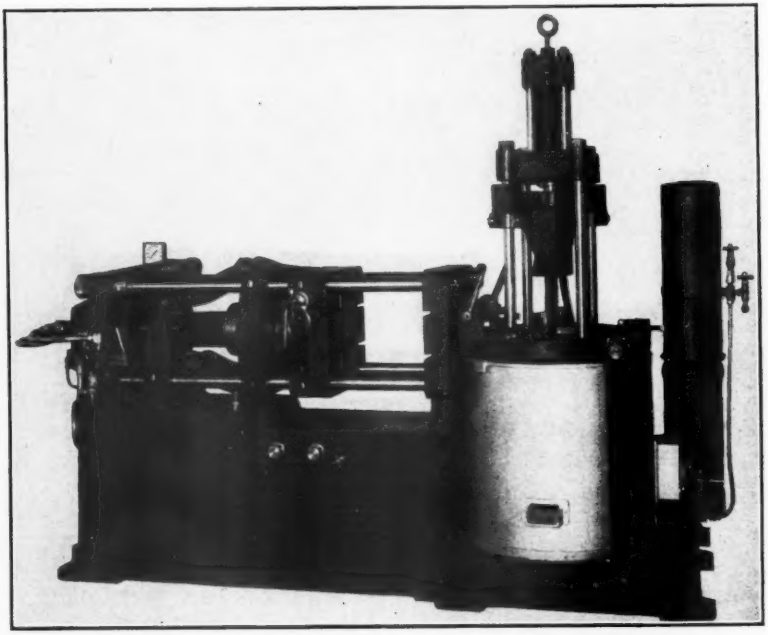

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Tool • Die • Machine **PROGRESS**

The National Tool and Die Journal

March, 1939 **Vol. 4, No. 12**

Obsolescence in Tool Rooms and Die Shops

By Wendell E. Whipp
President
National Machine Tool Builders' Assn.
President
The Monarch Machine Tool Co.

MACHINE tool salesmen have noticed a definite trend in recent years toward the more careful analysis of proposed machinery purchases on the basis of the return which can be conservatively expected on the investment required. The formulas used vary, but only in detail. The major factors are usually the same. We have the cost of the new machine and the tooling required for it, the cost of freight, motor and installation. As a credit we have the value of the old machine that is replaced. We know what the old machine can do, and we can estimate, conservatively, what the new machine can produce. With these figures in hand, knowing the cost of his direct labor, the Works Manager can make an intelligent decision.

The improvement in finish, the ability to meet closer tolerances, the reduction of maintenance costs and the greater safety for the operator, are "by-products." We expect to get them, and we agree that they have value, but they do not enter directly into our decision because we cannot appraise them accurately in terms of dollars.

Just how soon the new machine must "pay out" to justify the investment is a matter of executive judgment, but cases where machines pay for themselves in a year are not uncommon and two years is a popular standard. This seems commonplace until we realize that this means that the machine tool is returning 50% on the investment. Considering the present level of interest rates it is clear that such installations are extremely profitable for the machine tool buyer.

But this method of buying is intended for production machines: What can we do about the machines in the tool room? While some tool rooms are on a production basis and can figure operating costs on much of their equipment, there are others where many fine machine tools are really "stand-by" equipment. Not

a high rate of sustained production, but convenience, safety, accuracy, fine finish —the very qualities that we find it so difficult to appraise, must justify the purchase of a new machine tool.

Now the depreciation of equipment is a peculiar thing. It is one thing when shop men discuss their equipment, it is another when the collector of Internal Revenue comes into the office. It is an invisible force that is constantly at work, ignore it though we may. Every enterprise is subject to it; all buildings and equipment are its prey. It is the result of wear, of rust and decay, of damage due to careless handling and of obsolescence. And of all these, that last one may be the most important.

It is the American way not to cling to old equipment if there is a better way to do the work. The rapid development of faster, more accurate machines hastens obsolescence of those we have on hand. Even during a depression—perhaps I should say *especially* during a depression, the machine tool designer is at work, modelling the experience of his own organization and of many customers in all parts of the world into one finished new design. It has been estimated that the life of any model of machine tool is, on the average, seven years. By that time a newer, better machine is on the market. There has been a very marked development in the types of machines used in the tool room and die shop in recent years, as all of us know.

Depreciation Is Variable

It is evident that depreciation does not always move at the same pace. The useful life of machine tools varies over a wide range. It is comparatively long in large slow moving tools; in shops where great accuracy is not required. It is much shorter in the tool room where accuracy is vitally important and where most of the machines are small and fast. Here the endless variety of the output makes production control a difficult problem—and here we have our highest wage rates. Here in the tool room and the die shop we need to be most conscious of the pressing need for better machine tools.

I would not decry for a moment the wisdom of purchasing on a factual basis. We just can't have too many facts. But in our concentration on production machines let us not neglect the machine tools in the tool rooms. We can't apply the same formulas. The decision becomes a matter of keen insight rather than figures that are self-evident. But we are dealing with equipment that forms the very foundation of the shop.

Of what use our husky, expensive high-production line if a cutting tool or a special tool breaks down? How can our huge presses do their work economically without accurate dies? Of what use the split-haired accuracy in a production machine tool if we cannot give the operator accuracy in cutting and forming tools—in dies, in fixtures and in gages?

Tool Room Is Key To Production

To a casual visitor the production line holds all the thrill, all the romance, but to an understanding shop man the key to production is over in the tool room. It is a much quieter place and things do not move at so rapid a tempo, but it is literally the mechanical heart of the entire plant.

The years have a way of slipping by—we hardly realize how old these machines have become—until we check them up. In the meantime machine tool designers have been busy. Here, in the tool room, where the standard of accuracy is established for the entire plant, where our best work must be done, our study of obsolescence should begin.

We know that American industry is weighted and slowed down by the age and inadequacy of a heavy percentage of its machine tools. We know that only by increasing the output of industry for each worker employed can we restore prosperity and maintain the desired standard of living. We are determined not to meet the low price labor of foreign nations by cutting our own labor rates; we must then *offset* that competition by increasing and improving the quality of our output.

We must *fight* to bring our equipment up to date and better business conditions just ahead provide the needed leverage. Both government and private enterprise are coming to realize that they must no longer postpone the needed replacements.

The tool room is crying for attention. Let's begin there.

Die Designing and Estimating

Advanced Series

III

By GEORGE DANNES

George Dannes is superintendent and engineer of the Raffel Manfacturing Company of Chicago, and instructor in the advanced class studying Die Designing and Estimating at the Carl Schurz High School under the auspices of the Chicago District of the Special Tool, Die and Machine Shop Institute.

LAST month the making of a simple blanking die was discussed and it was classified into the various machine operations necessary for its construction. It was shown that, even for the simple die which was illustrated, a comparatively large number of items and machine operations had to be taken into consideration when attempting to make an estimate of its cost.

It is also apparent that estimating the cost of each operation and die part individually would require considerable time. Although all of the parts and operations represent fixed factors which determine the cost of the die and they must all be dealt with, it is not necessary to follow such a cumbersome procedure.

Let us therefore endeavor to work out a method for tabulating the operations according to their relationship to each other and also for grouping the various die parts without overlooking any operation or losing track of an individual part. A comparison of the numerous machine operations from the standpoint of their relationship results in their classification as follows:

GROUP A—MACHINING:
- Squaring of blocks — die, punch, punch plate, stripper, etc.
- Grinding before and after hardening

GROUP B—HOLES:
- Screw and dowel holes
- All other holes (except perforator or pilot holes)

GROUP C—LAYOUT:
- Die layout, die opening
- Location of perforator, etc.
- Inspection

GROUP D—WORK ON DIE:
- Machining of die opening
- Finishing of die opening
- Machining and fitting of punch
- Opening in punch plate
- Clearance in stripper and die shoe
- Stripper slot

GROUP E—ACCESSORIES:
- Perforators, pilots
- Perforator and pilot holes in die, punch plate, stripper and die shoe
- Knockouts
- Stops
- Nests
- Spring pins and miscellaneous accessories

GROUP F:
- Assembling
- Development
- Tryout

These six groups should include all requirements. They have been arranged according to their relationship in time-consumption and the similarity of the operations rather than in the succession

in which they might follow each other in actual construction of the die, thus:

GROUP A—
The time consumed for squaring a block is in direct relation to the time for grinding it, because both time values are dependent on the size and proportions of the block. They should, therefore, be established simultaneously, regardless of how far apart the operations actually are when the die is being made.

GROUP B—
Is self-explanatory, because all holes have to undergo similar operations such as drilling, boring, reaming, tapping, etc.

GROUP C—
Layout and inspection have a similarity of time values, depending on the accuracy required and tolerances specified. In other words, with close tolerances, more care is required in layout and naturally closer inspection of all vital parts during the construction of the die is necessary.

GROUP D—
This group is the most important from the standpoint of time consumption and, more than in any other group, time values are related to each other. For example, the time required to remove material for a die opening of prescribed perimeter is proportional to the time required to machine the outside dimensions of the corresponding punch. Clearance holes in stripper and die shoe and the opening in the punch pad are similar. Other similar values falling in this group are inserts in die and punch, stripper, slot, pad and shedder, in fact all die parts which require some machining or finishing operation and which are actual working parts of a shape and character necessary to the production of a finished product part.

GROUP E—
All accessory equipment not actually producing the part but necessary for the proper functioning of the die. Examples: gages, nests, knockouts as well as perforators, pilots and their corresponding holes.

GROUP F—
Includes assembling of all die parts to punch holder and die shoe, also tryout of the completed die.

NOTE: Time values for these machining and assembling operations have been obtained from time studies made in different shops.

Figure 5 shows the estimating form which has been developed from the data above. The parts listed refer to the blanking die and product part illustrated in the previous chapter* but the form is usable for estimating the cost of any die. Column headings A through F corresponding with groupings of the operations and component parts of the die are indicated horizontally. The

*Appeared in February issue but is reproduced here.

MACHINE OPERATIONS

ALL DIE PARTS	A	B	C	D	E	F
DIE	.6 .8					
PUNCH	.3 .5					
PUNCH PLATE	.4 .3					
STRIPPER	.4 .3					
DIE SHOE						
PUNCH HOLDER						
STOP						
INSPECTION						
TRYOUT						
TOTAL	3.6					

Fig. 5

WIDTH.

THICKNESS / LENGTH	¼	½	¾	1	2	3	4	5	6	7	7½	8	9	10	11
3	¼	½	¾	1	2	3	4	5	6	7	8	9	10	11	12
2	½	¾	1	2	3	4	5	6	7	8	9	10	11	12	13
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
½	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

TIME IN HOURS

LENGTH															
1	.3	.3	.4	.4	.5	.5	.5	.6	.6	.6	.6	.7	.7	.7	.7
2	.3	.4	.5	.5	.6	.6	.6	.7	.7	.7	.8	.8	.8	.9	.9
3	.4	.5	.5	.6	.6	.7	.7	.8	.8	.9	.9	1.0	1.0	1.1	1.1
4	.4	.5	.6	.6	.7	.7	.8	9	1.0	1.1	1.1	1.2	1.3	1.3	1.4
5	.5	.6	.6	.7	.8	.8	.9	1.0	1.1	1.2	1.2	1.3	1.4	1.5	1.6
6	.5	.6	.7	.7	.8	.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8
7	.5	.6	.7	.8	.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.0
8	.6	.7	.8	.9	1.0	1.1	1.2	1.4	1.5	1.6	1.7	1.8	1.9	2.0	
9	.6	.7	.8	1.0	1.1	1.2	1.3	1.5	1.6	1.7	1.8	2.0	2.1		
10	.6	.7	.9	1.1	1.2	1.3	1.4	1.6	1.7	1.8	2.0	2.2			
11	.6	.8	.9	1.1	1.2	1.4	1.5	1.7	1.8	2.0	2.3				
12	.7	.8	1.0	1.2	1.3	1.5	1.6	1.8	2.0	2.3					
13	.7	.8	1.0	1.3	1.4	1.6	1.7	1.9	2.1						
14	.7	.9	1.1	1.3	1.5	1.7	1.8	2.0							
15	.7	.9	1.1	1.4	1.6	1.8	2.0								

FIG. 6.

use of a form of this kind should provide the assurance that every individual die part is listed and every required machine operation is given due consideration.

Let us now give some attention to Figure 6 which is a table for estimating the squaring of blocks used in a die. The figures are based upon taking one cut on each of the six sides of a block including the required set-up time. Dimensions are indicated in inches and time values in hours. Oil hardening tool steel is the basic material. For cold rolled and machine steel, 70% of the indicated values are sufficient. For high carbon-high chrome steel and similar "tough" materials use 120% of values in the table.

Earlier in this article it was stated that the time required for squaring a given block and the time necessary for grinding it bear a fixed relationship to each other. For grinding estimates therefore use:

For plain set-up—50% of above values plus .1 hour.

For indicator set-up—50% plus .3 hour both before and after heat treating which is thus the equivalent of 100% of the table value for squaring plus .3 hour.

NOTE: If a piece of cold rolled steel, or other material which requires no heat treatment, is to be ground, 50% of the squaring-up time is used plus .1 hour for setting up in the surface grinder.

If the piece to be ground is tool steel it will generally have to undergo the grinding operation preparatory to layout and then another after it has been heat treated. Therefore 100% of the squaring-up time is added, plus .2 hour for setting up. If the set-up is intricate, however, and requires the use of the indicator, .3 hour is added to the grinding and squaring time.

It should be pointed out here that all time values as presented include "handicaps" such as waiting for a machine-time out for studying prints and similar time losses which occur in every tool room and die shop. The time values, therefore, are *not* the actual elapsed time

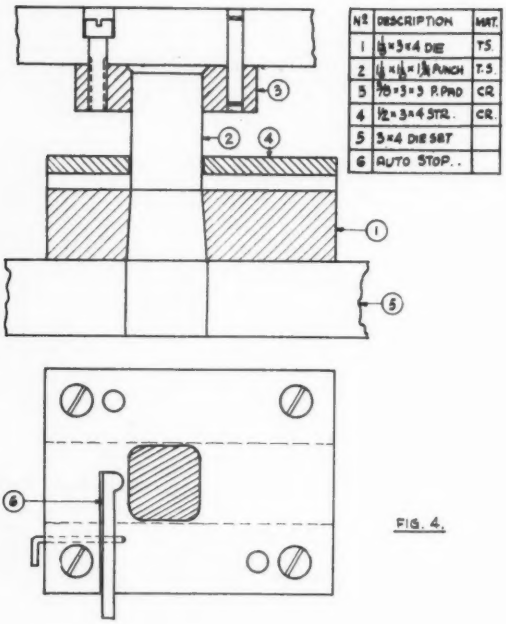


FIG. 4.

Figure 4 is reproduced from the February issue as a convenience to the reader who wishes to follow Mr. Dannes' estimating methods in detail.

only which is required for machining a given block of steel plus a safety factor to compensate for these time losses.

It is time now to make actual use of the principles laid down and the data which have been developed. First make a copy of the estimating form illustrated in Figure 5, the spaces to be filled in as we proceed.

Using Figure 4 in the previous chapter we begin with the die block, the dimensions of which are 1⅛" x 3" x 4". The nearest thickness according to the table in Figure 6 is 1". Follow to the right to 3 which represents width in inches, then down that column to the value for a length of 4". The time value given at this point is .6 of an hour. Write this in column A immediately after "Die."

To arrive at the grinding time we make note, first, that two set-ups are necessary—before and after hardening. The formula therefore is:

2 x 50% of .6 hr. plus 2 x .1 hr. or a total of .8 hr.

Place this in the same square with the machining time then follow the same arithmetical procedure with the dimensions of the punch, first locating thickness, length and width in the chart in Figure 6. Always use dimensions nearest to the actual sizes. The punch dimensions being 1" x 1" x 2" the resultant machining time is .3 hour. Place this in column A after "Punch" and in that same square indicate also the grinding time, which in this instance is .5 hour. The punch pad is next with dimensions ⅞" x 3" x 3" (table value ½" x 3" x 3") which results in a time value of .5 hour. Being made of cold rolled steel, 70% of the estimated time is sufficient. This would be .35 hour but we use .4 for easier figuring. Only one grinding set-up is required in this instance, therefore 50% of the squaring time plus .1 hour brings the time estimate to .3 hour.

The stripper is disposed of in the same manner, the machining time being .4 hour and the grinding time .3 hour. No other parts of the die require machining therefore the A column is ready to be added, the total for machining and grinding being 3.6 hours.

It is suggested that die parts sizes be selected at random and machining times recorded to familiarize the reader with the use of the chart.

Next month operations which come under Group B—Holes, and Group C—Layout, will be discussed and if space permits possibly a part of Group D.

Quality Dies as a Production Economy

By Raymond H. Haserodt

Superintendent, Geometric Stamping Co.

IN coping with modern technical and market requirements the stamping manufacturer finds his greatest asset in a good set of tools. Should dies go into press and refuse to operate, he will find he cannot make required delivery for his customer who operates on a small bank of material and whose conveyor lines will be tied up 100% unless an even flow of stampings is furnished.

It no longer is sufficient that a set of tools be free of design or structural defects because technical standards are such that we no longer talk of "commercial stampings" but of "blue print tolerances." Stampings are now required to compete with machined parts and dies must produce parts with a finish acceptable to a coat of paint with no metal finishing allowed.

In the design of a die for producing modern stampings, four standpoints must be considered.

1. Design from the standpoint of producing a part. The first consideration is the product to be made. It is evident that the product designer and the die designer should always understand each other's problems and work together. The press equipment a stamping company may have will influence the die design a great deal.
2. Design from the standpoint of producing maximum production with a minimum of die upkeep. It is a well known fact that stamping dies are subject to tremendous intermittent pressures, a reason for the designer to provide ample cross sections to resist these pressures. The designer has at his disposal various types of metal which will resist wear. Where long runs are necessary, we find him favoring high carbon-high chrome types of steel. In selecting material it is very important that the designer select his material from the standpoint of intended use. All forming edges which have a tendency to wear excessively should be so designed and have adequate adjustment allowances to avoid or minimize the replacement of new sections. This is very important from the standpoint of die upkeep.
3. Design from the standpoint of causing minimum fatigue to the press operator. This is a very important phase of modern die practice especially where the operator handles ten to twelve tons of steel in a day's work. It is also important that dies and gages be so constructed that parts may be placed in the die with the least possible effort. Also that knockouts, pullouts, etc., eject parts without any effort on the part of the operator. In some cases we find it is necessary to use spring buttons or ball bearings backed by springs to release stampings. Dies should be designed so that the part will lie in a position where it will require the least amount of motion on the part of the operator to perform his work. The need for this can readily be seen in motion studies of operations.
4. Design from the standpoint of the accuracy consistently required of the part being produced. In various operations, such as the operation of shaving dies or perforating dies, it is important that the die maker hold stampings to plus or minus .001". In order to do this consistently the designer should have generous bearing on punches so

there can be no chance of deflection. The guide pin-die set should have ample proportions so punches can be registered accurately. On this type of die, it is very important that the die section or sections be corrected after hardening.

In addition to the four standpoints or conditions concerned in the design of dies for efficient and economical stamping production, there are two other phases of sound die practice that should be mentioned as they also have a bearing in determining the final stamping cost.

Materials Must Be Right

The first is selection of material. In straight blanking operations and in cases where high production warrants, high carbon-high chrome steels will greatly increase part production per grind. In some cases we also find it advisable to reduce cross sections and substitute a higher quality or hardness of material and still take advantage of longer production per grind and not increase the price of materials used. In forming operations where the finish of the part is very important, a grade of steel with a tendency to liberate free graphite is desirable. This condition is very helpful as it has a tendency to glaze all forming edges and eliminates scratches on stampings. This can be purchased either in cast shapes, or a graphite steel will act in the same manner. The designer may find that the finish desired will compel him to deviate from ferrous to non-ferrous metal and use bronze as a material. This can be purchased in various states of hardness, to suit the type of work to be performed.

The other phase is workmanship. I cannot stress too strongly the necessity for "close" workmanship in constructing dies. In the construction of dies we are practically building a special machine to serve a special purpose. The same degree of accuracy isn't equally important in every part. There are some parts on which it would be foolhardy to spend a lot of time. Other parts should be as accurate as it is possible to produce them. It is very important that leader pins be bored in proper relation to the punch base so when the die is assembled parts line up accurately. Punches should be located accurately without an excessive amount of peening. When punches have been excessively peened or corked, in production they will tend to come back to the original position forming excessive burrs on stampings. It is very important that distortions, if or when they exist on hardened sections, be corrected by grinding. If sections in a die have not the proper bearing surface and are merely resting on a series of spots they will quickly pound themselves in, resulting in a different condition in stampings from those first produced. Die shoes should be of sufficient strength to resist shock without distortion. Wherever possible die sections should be backed up with plenty of support to eliminate any give which may take place under the pressure setup on the die. These are some of the things that help in eliminating die repairs.

Whether you build tools in your own tool department or purchase on the outside, conditions should be carefully analyzed from these standpoints and the progressive engineer is the one who will take every means to have tools designed to avoid or overcome difficulties which may develop in production.

"PROGRESS NEED NOT TAKE US BY SURPRISE"

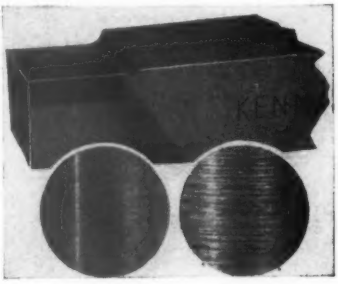
"IT is the American way not to cling to old equipment if there is a better way to do the work", says Wendell E. Whipp in the leading article in this issue. In a recent radio talk on the Ford Sunday Evening Hour, W. J. Cameron hopefully points out, "No future American generation is likely to go to sleep again believing itself safe from the rude alarm clock of progress. That happened to us once; now we are awake. We know that progressive change is the order of life . . . It is possible to see, in a fairly general and inclusive way, what is coming . . . Not only do we expect it, we know in a general way from what directions to expect it. All of us are geared to the tempo of change."

New Carbide Alloy for Machining Metals

"KENNAMETAL", a new, reliable, hard carbide alloy for machining tough metals such as steel heat treated up to 500 Brinell, combines roughing and finishing in one operation. The basic ingredient is tungsten-titanium carbide (WTiC2) and the new alloy may also be used in machining monel metal, malleable iron, cast iron, brass, bronze, aluminum, and other metals. Kennametal, which is harder than the hardest tool steel, makes it easy to torch braze your own tools.

Kennametal is available in three standard blanks from which tools may be tipped by the user. A total of 18 styles of tipped tools for operations such as reaming, boring, tapping, milling, and gaging, are offered. The illustration shows Style No. 11 tool, tipped with Kennametal, and the unretouched inserts show the smooth finish form-tooled bar stock (magnified three times) as compared with surface machined with high speed steel, or tungsten carbide.

The manufacturer states that Kennametal permits two to six times greater



cutting speeds than those of high speed steel and ten to fifty times as many pieces per grind of tool.

A new descriptive booklet TD-4 on Kennametal will be sent by the manufacturer, McKenna Metals Company, Latrobe, Pa.

Do You Assemble Parts for Welding?

If you weld parts, then you have the problem of momentarily holding the parts in fixtures.

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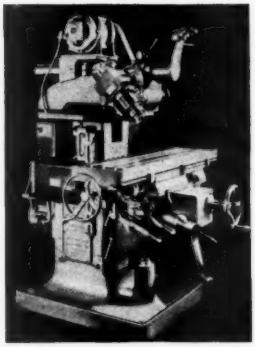
"Most Flexible of Universal Milling Machines"



THE No. 22 New Van Norman Universal Miller has the flexibility and ease of adjustment that is essential for low cost operation in tool rooms. The swiveling cutterhead and the sliding ram eliminate full one-half of all setups usually required. The operator does not change the setup of the work when there is a shift from horizontal to vertical or vertical to angular milling for example. He loosens the three bolts that bind the cutterhead to the ram, swivels the head to the required position—loosens two clamps, moves the ram, reclamps and goes ahead with the cut. The No. 22 not only mills, it bores and drills, cuts slots, does high speed routing and cuts spirals.

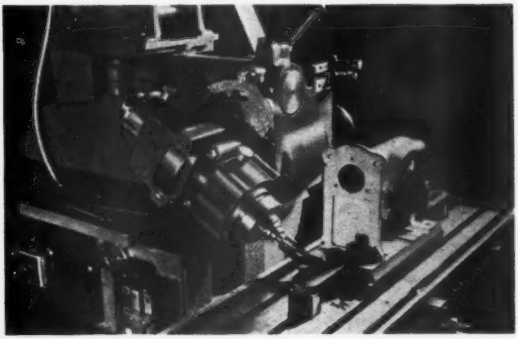
The No. 22 is a very solid and rigid machine, designed from base to cutterhead for heavy cuts at high speed. Antifriction bearings are included as part of the design throughout. There are nine spindle speeds from 40 to 1100 RPM (the high speed attachment increases the available speed three times); sixteen feed changes (power feeds in all directions—table, cross and vertical feeds). All gears are heat treated steel, mounted on heat treated shafts. Cutterhead drive gears are of spiral bevel type, hardened and lapped for smooth delivery of power to the tool.

Like all Van Norman Millers, the No. 22 is designed and built primarily for tool room and die shop work.

A safety provision on both main drive and feed gears makes it impossible for the operator to select combinations of gears that might result in broken teeth. An electric interlock is available to eliminate the possibility of operating feed if cutter is not revolving.

Attachments, all specially designed for the No. 22 and all incorporating advanced design, are available. These include 10" full universal centers, the subhead, the universal slotting attachment, coolant system, interior sliding spindle for the cutterhead and a high speed milling attachment.

An attractive 8-page booklet on the No. 22 Van Norman Universal Miller, with many action photos of jobs in process, is available on request from the Van Norman Machine Tool Company, Springfield, Mass. Ask for booklet P-22.



The No. 22 handles all machining operations on this complicated casting. Here the machine is finishing the angular surface of the base. Because the cutterhead swivels, there is no need for a complicated blocking job in setting up the piece, no special cutters. The angular surface is machined as quickly and easily as vertical.

Just Out—

Die Designing and Estimating

by

Charles Bohmer

THE fundamentals of die designing and the requirements for die cost estimating are presented in a practical, easy-to-follow style in this new book.

Considerable technical descriptive material has been written on die designing but much of it was, and is, so difficult to follow that its use is frequently limited. This book, a compilation of the series published in Tool·Die·Machine PROGRESS during 1938, is not only the work of a man who is a master of his subject but it is also a presentation that has proven successful as the basic teaching material in a Tool and Die Shop Course in one of the leading technical schools of the country.

Comparatively little has been written on die designing and estimating that is usable equally well by the average shop man and the apprentice but *in this new book* "Die Designing and Estimating" *the presentation is so practical and fundamental* that estimating can be directly developed from the text.

The book is written simply and to the point. It is illustrated with diagrammatic sketches depicting essential operations and types of dies described in the text and with numerous captioned photographs of completed dies, die parts and die making equipment and methods.

An adequate topical index makes the material readily accessible.

A Shop Edition is now ready. At the special price of one dollar ($1.00) postpaid, (Regular Edition $1.50) "Die Designing and Estimating" is available to every man interested in die building and sheet metal stamping.

Send orders to TDM PROGRESS, 311 Fairmount-Cedar Bldg., Cleveland, O.

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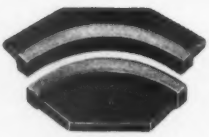
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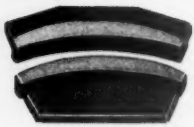
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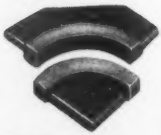
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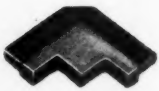
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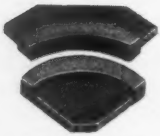
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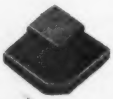
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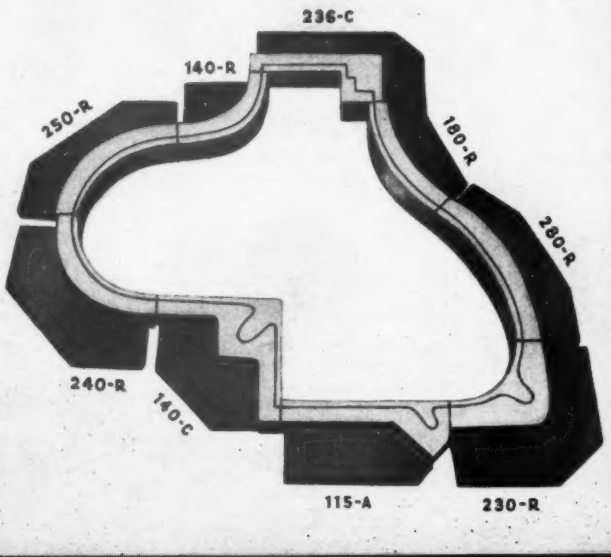
Think of it, a savings for you from 18% to 47% on die costs, because FCC has devised 35 standard composite steel die sections to make it easier for you to get in production quicker! These sections are made of tool steel* electrically welded by special process to an easily-worked base of SAE 1020, from which you can make any die you need for blanking regular or irregular shapes from sheet metal. Prepare now to reap your full benefit from this remarkable advance in die making—write today for blueprints and complete information.

• • • • and HERE is HOW *Easily* it's DONE

First you select the proper sections from the blueprints of the 35 sections with your design—then order by number—it is as quick and easy as that. To illustrate this more graphically we show a photo to the left with all 35 die shapes numbered, and below is a die that has been constructed from nine of these 35 standard sections. You will readily see from this how easy it is to construct dies the new FCC way with the minimum amount of machine work and why you realize definite savings in using them.



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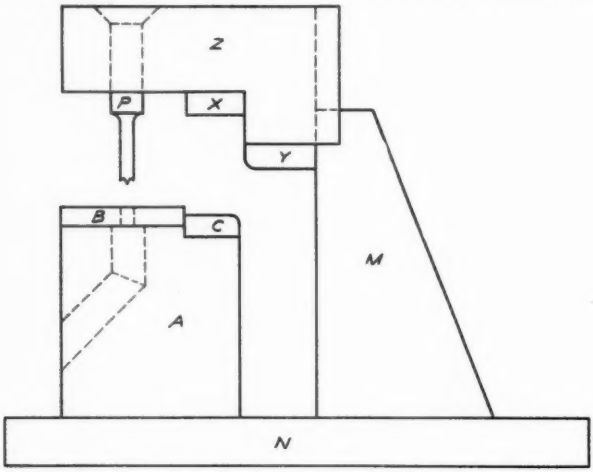
Shop Kinks

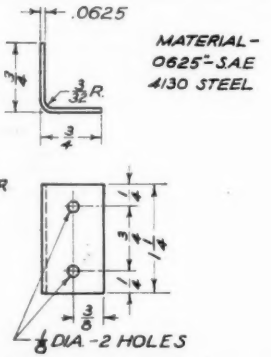
This Department, created by the interest of our readers, will be a regular feature of T·D·M PROGRESS. Readers are invited to send their "pet" shop hint or kink to the Editor.

A Die to Pierce, Form and Shear in a Single Operation

SOME time ago we were in need of a quick and inexpensive way to manufacture a number of small angle braces with two holes, both on one leg. We designed the die illustrated herewith which solved this problem with very satisfactory results. The material used was .0625" thickness of S.A.E. 4130 steel 1¾" wide. The two holes were ⅛" in diameter. A and Z are milled from CR Steel; B, C, X and Y are ¼" thick Tool Steel; P is also of Tool Steel; M and N are CR Steel.



A - BODY OF DIE
B - PIERCE AND SHEAR PLATE
C - PAD
M - GUIDE AND STOP
N - BASE
Z - PUNCH AND SHEAR HOLDER
X - SHEAR PLATE
Y - PAD
P - PUNCH



A stripper plate should be used and can be attached to A with the same screws that attach B to A. We used

countersunk screws to attach B, C, X and Y. By using a good grade of tool steel and making B, C, X and Y removable, it is easy and inexpensive to renew worn parts and heat treating is simplified.

The punch should extend about ⅛" below the pad Y. The top of the pad C should be below the top of pierce and shear plate B approximately 1½ times the thickness of stock to be formed. The size of chip or slug passage O should be approximately twice the diameter of the punch. By drilling slug passage as shown it is not necessary to mount the die on a bed plate having chip clearance openings.

M is used to stop stock for correct length and also as a guide. Z is milled to slide on M.

The body of the punch should be as long as possible where small diameter punches are used.

I. W. Pike, Foreman Tool & Jig Dept., Fairchild Aircraft Corp., Hagerstown, Md.

Cylindrical Checking Gages With Guaranteed Accuracy of 0.000025"

THE Grobet File Corporation of America, which last year introduced its line of high speed steel flat drills for the piercing of small holes, now announces its new line of Cylindrical Plug Gauges for the checking of such holes.

The illustration shows actual size of one of these gauges.

The cylindrical plugs of high carbon tool steel are hardened, ground and precision lapped. The plugs are held in a hollow hardened steel holder by a collet. They are easily removed, reversed or replaced. The guaranteed accuracy is plus or minus .000025" (.0006 mm.).

Gauges are available in diameters from .010" to .084" in every .001". Also, on special order, diameters from .004" to .150" in every .0005", .00025" or .0001" or in the metric system from .25 mm. to 4.00 mm. in every .0025 mm.

Double end gauges, to check tolerances, can also be made to order.

A pamphlet P-44 giving full specifications is available from the manufacturer, Grobet File Corp. of America, 3 Park Place, New York, N. Y.

120,000
JOHANSSON GAGES
at less than ¼c per gage

No. 1 Johansson Set consists of 81 blocks. They make 120,000 different size gages, in steps of .0001 inch, from minimum size .200 to more than 12 inches. Only $295, with every block in the set accurate to within ±.000008 inch. Johansson Blocks are sold separately and in a wide variety of smaller sets. All blocks are made in three degrees of accuracy: ±.000008 inch; ±.000004 inch; ±.000002 inch. Information on Johansson Gages is worth keeping on hand. Mail the coupon for free Catalog No. 12.

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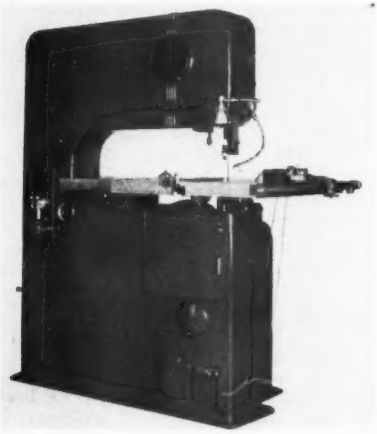

Continental Puts a New DOALL in Production

IN 1935 Continental Machines, Inc., placed its first all-purpose die cutting band saw on the market. The machine was made possible through the development of very narrow band saw blades. Since then, these narrow saws have been developed to a still higher point of toughness and have been made in still narrower widths. As a die making machine, the "DOALL" was a real step forward because it eliminated the tedious method of drilling-a-row-of-holes to make an inside cutout.

The Model V-36 DOALL, just put into production, symbolizes the present position of contour sawing. The new DOALL is the largest and most massive machine tool in the Continental line with a 36" throat and 10" work height capacity. The work table tilts in four directions, is 30" square and 2½" thick, box type construction. It saws the toughest stainless and high carbon steels and it cuts aluminum, brass, plastics and softer substances.

Saws for internal cuts are instantly welded into bands with an automatic butt welder in the machine. An entirely new type of saw guide has been developed for this machine. It holds the back of the saws more securely and closer to the work both below and above the work table. These guides are adjustable for wear. A small grinder wheel, mounted in the panel just under the automatic butt welder, removes the "flash" of the weld on the saw bands.

The new V-36 DOALL removes a section as a whole piece, instead of reducing it to chips, thus saving material. Contour sawing makes a clean, machined finish without distorting the metal or materials in the cut. A motor drives the machine through the new "Speedmaster" solid Bakelite pulleys, which give an infinite variety of variable speeds, and then through a silent transmission of 8 helical gears which run in oil. A speed range of 0 to 1500 surface feet is available, a convenient tachometer indicating the exact speed. The correct speed to use for various jobs is shown on "the job selector," a dial also conveniently located for the operator's vision.

The V-36 DOALL cuts at the rate of 1½" per minute in 1" thick tool steel. In cast iron it cuts 3½ square inches per minute. There is practically no limit to the work thickness capacity. The new machine also operates file bands and polishing bands for jobs that require high "finish" after the sawing operation. The DOALL is basically a shape cutting machine—using the narrow band saws, but it is possible to use abrading bands also. As it takes only about a minute to change bands, the operator can take the job through to completion.

Built-in construction and modern styling give the machine the much talked about "consumer design appeal." Although this model began production in 1939, it is already in use at the Geneva, Switzerland, Works of the world famous jig boring machine manufacturer and the Dearborn Works of the Ford Motor Company and the Galex Works of George H. Alexander Limited, Birmingham, England.

Literature on the new V-36 DOALL is now available for distribution. Write Continental Machines, Inc., 1303 Washington Avenue, South, Minneapolis, Minn.

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SPECIAL BUSHINGS MADE ON VERY SHORT NOTICE

TRY ACME BETTER BUSHING SERVICE

● Lead their field with consistent Quality and Service.
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Concentric within .0003" Full Indicator Reading.
Heat treated to 62-64 Rockwell hardness.
Shipments from stock of 6700 ACME Standard items and 4200 A.S.A. Standard items.

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ACME Leader Pins and Bushings, and Dowel Pins maintain the same standards of accuracy.

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We also specialize in complete machine part manufacture requiring extremely close limits, lapped fits, etc., for pressures up to 20,000 pounds per square inch.

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Send for complete catalog or specific data sheets.

ACME INDUSTRIAL CO.

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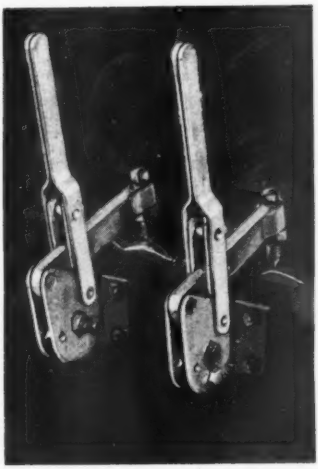

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The modern, practical, low cost way to hold production parts for machining, reaming, drilling, welding, or assembly operations. Quick, positive clamping, and instant release when desired. Several sizes. Ask for catalog.

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Quick acting, toggle action, hand pliers for clamping parts for various operations. Lock automatically, hold tight, release quickly.

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High Precision or commercial Production—a few Pieces or a million

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New Arc-Fit Tool Cuts Welding Cost

ARC-FIT, a new development, is a shearing die that prepares pipe and tube ends for welded tee joints, bevel joints and double tee connections. A tee can be sheared to a perfect fit, ready to weld, in five seconds. Pipe or tubing is fed endwise over top shearing lip die.

The first operation shears out one-half of the radius. The pipe or tubing is then rotated 180 degrees and the second operation shears out the other half of radius completing a perfect tee. These fits are produced with no distortion to pipe or tube. Cost reductions over old methods such as milling, grinding, filling, burning and hole sawing are obvious.

Angle or bevel tees are made by mitre sawing pipe and shearing off lip with Arc-Fit. In pressure piping work a circular hack saw is used to drill press or hand drill to saw hole in wall. Lead-in is sheared on Arc-Fit and pressure tee connection is ready to weld.

The Arc-Fit Hand Press, as illustrated, is of plate construction with wearing parts of hardened steel. In sizes up to 2", standard pipe can be used in the hand press. Arc-Fits are interchangeable from hand press to power punch press with no wasted time for die changing.

Of sub-press design, Arc-Fits are operated in any punch press with at least 7" die space and necessary tonnage capacity to perform the shearing.

When you order or write about products described in TDM PROGRESS please mention the publication.

Arc-Fit is made in 3 standard sizes to take 1¼", 1½" and 2" black pipe or tubing. Other sizes can be furnished.

Literature is available on Arc-Fit from Dries & Krump Manufacturing Co., 74th & Loomis Avenue, Chicago, Illinois; address Department S-3.

Columbia Tool Steel Issues "Heat Treating Guide"

A "HEAT Treating Guide," a revolving index with windows that show grades, types, analyses, heat treating temperatures and Rockwell hardnesses of Columbia Tool Steels, is being distributed to the trade by the Columbia Tool Steel Company. The Guide gives a convenient, accurate and complete specification grouping of all grades of Columbia Tool Steels.

The Heat Treating Guide is made of card stock and is cellophane covered for long service.

For your Heat Treating Guide write Columbia Tool Steel Company, 410 East 14th, Chicago Heights, Illinois. Ask for Heat Treating Guide No. P-2.

SEEING IS BELIEVING

When YOU see how a

WALTON TAP EXTRACTOR

Backs out broken taps without annealing, drilling or damaged threads

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That's why we ship on 30-days Free Trial.

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Each Tool Must Sell Itself

THE WALTON CO.

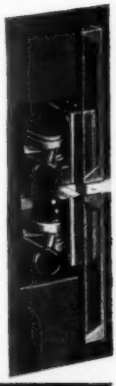
88 Allyn Street Hartford, Conn.

MODERN DIE-MAKING MACHINES

PERFORMANCE...
COMMANDS ATTENTION

The New **IMPROVED GROB BUTT WELDER**

Here is a unit, truly superior in fast, sure, saw blade welding. New exclusive features give perfect welding of $\frac{1}{16}$ to ½ inch wide saw blades—no experience needed. Serves a large battery of sawing machines because it is portable to the job.



View of Saw Blade Clamps Ready for Welding

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PRICED REMARKABLY LOW

WRITE OR WIRE FOR INFORMATION

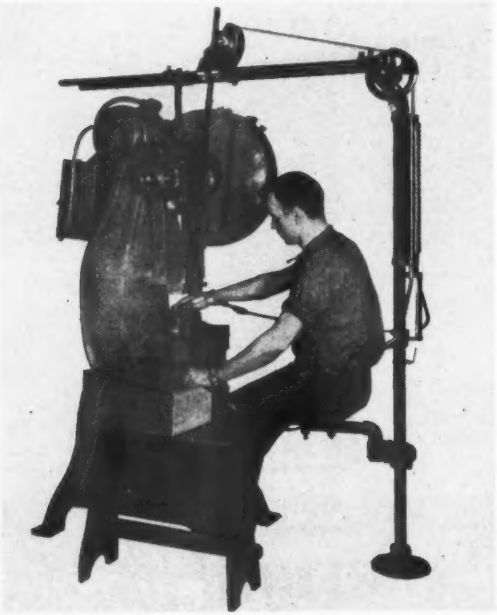
COMPLETE WITH BUILT-IN GRINDER ONLY . . WELDER WITHOUT GRINDER . . . $80 **$98**

GROB BROTHERS
GRAFTON, WISCONSIN

When you order or write about products described in TDM PROGRESS please mention the publication.

Improved Possons Safety Device Announced

A NEW and improved Possons Positive Punch Press Safety Device is currently announced by the manufacturer, The Positive Safety Manufacturing Company. The Possons Safety Device, first introduced in 1924, is widely recognized as the most dependable commercial product of its kind obtainable, with over 7,000 in use in leading punch press shops in the country. Many leading plants have used Possons for more than ten years.



The development of the Red Arrow Pull-out Multiplier has greatly improved the efficiency of the Possons Safety Device. This attachment is of gear, rack and cam construction and provides for the safe removal of the operator's hands where the finger clearance is limited. The pull-back is geared to a 7:1 ratio on the first part of the stroke and is most effective on short stroke presses or where spring dies are used or drawing operations are performed. The Red Arrow Pull-out Multiplier can be geared to any ram stroke.

The standard of the Safety Device can be located at any distance from the bolster plate and where floor space is limited, the device can be supported from an overhead beam or attached directly to the ceiling.

New literature on the Possons Positive Punch Press Safety Device is available from The Positive Safety Manufacturing Company, 4406 Perkins Avenue, Cleveland, Ohio.

First Air Machinery Safety Code

THE American Standards Association announces the completion and approval of the first safety code for Compressed Air Machinery and Equipment. The present code, which has been developed out of the combined experience of manufacturer, user, insurance and governmental groups, is designed to cut down the number of accidents resulting from the wide use of compressed air today in numerous industrial applications including those in tool rooms. The code is published by the American Society of Mechanical Engineers in a nine page booklet, includes specific recommendations for the construction and use of compressors, tanks, pipe lines, etc., with separate sections on receivers and on utilization apparatus.

Nineteen national organizations and two departments of the Federal Government participated in the development of the code under the administrative leadership of the American Society of Mechanical Engineers and the American Society of Safety Engineers.

Bristol Uses Multi-Spline Design for Head Cap Screws

THE new Bristo Socket Head Cap Screws of multi-spline design are made by a patented process designed for producing a socket with splines by extrusion. The process assures grain structure arranged to give maximum strength in the direction of forces applied to the screw.

Particular claims made for the Bristo Socket Head Cap Screw and the companion Socket Set Screw are that they have been designed specifically for use in dies, tools, jigs and fixtures, since the multi-spline design gives increased strength with less wall thickness, eliminates "expanding pressure," can be assembled with greater speed, set tighter, will not round out and will stand up under the shock and grind of high speed production.

While the sizes available go to 1" in diameter for the socket set screws and 1½" for the head cap screws, the Bristo line specializes in small sizes—4, 5, 6, 8, 10 and 12 wire sizes.

Bulletin No. 835, giving full specifications and prices of Bristo Socket Set and Socket Head Cap Screws, may be had on request from The Bristol Company, Mill Supply Division, Waterbury, Connecticut.

Die Supply Adds Cerromatrix

The Die Supply Company of Cleveland has added to its other important lines of die makers' supplies the territorial distribution of Cerromatrix alloys. According to J. R. Fitzsimmons a complete stock will be carried in the Cleveland warehouse. Cerrobend and Cerrobase, also products of the Cerro de Pasco Copper Corporation, are in the new line.

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Stand for Quality

We made the *first* HIGH-CARBON — HIGH CHROME Steels which were also NON-DEFORMING, opening the way to

QUANTITY PRODUCTION

with all kinds of Dies and Press Tools

Oil-Hardening
"NEOR"

Air-Hardening
"COBALTCROM-PRK"
—the latter also in CAST FORM

have become the standard on which all subsequent similar kinds of Steel were based.

We supply also
High Speed Steels
in Bars, Forgings, Tool-Bits
as well as all types of
HIGH GRADE TOOL STEELS

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Write for descriptive Circulars

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Buffalo Forge Co., 477 Broadway, Buffalo, N. Y.

ASSEMBLING MACHINES—Automatic
Sommer & Adams Co., The, 18511 Euclid Ave., Cleveland, Ohio.

BARS—Rolled Composite
Forging and Casting Corp., Ferndale (Detroit), Michigan.

BEARINGS—Ball, Roller and Thrust
Ohio Ball Bearing Co., 4581 Euclid Avenue, Cleveland, Ohio.

BENDING MACHINES—Special
McKinney Tool & Mfg. Co., The, 1688 Arabella Rd., Cleveland, Ohio.

BENDING MACHINES—Angle Iron
Buffalo Forge Co., 477 Broadway, Buffalo, N. Y.

BOLTS—Stripper
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Die Supply Co., 2059 Hamilton Ave., Cleveland, Ohio.

BORING BARS
Eclipse Counterbore Co., 7428 St. Aubin Ave., Detroit, Michigan.

BUSHINGS—Die
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Die Supply Co., 2059 Hamilton Ave., Cleveland, Ohio.

BUSHINGS—Drill Jig
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.

CARBIDE ALLOY TOOLS and BLANKS
McKenna Metals Co., 500 Lloyd Ave., Latrobe, Pa.

CASTINGS— Nitri-Cast-Iron, Air and Oil Hardening Tool Steel Cast to Shape
Forgings & Casting Corp., The, Ferndale (Detroit), Mich.

CHROME PLATING—Dies and Machine Parts, New and Worn
Master Chrome Service, Inc., 5611 Herman Ave., N.W., Cleveland, Ohio.

CLAMPS—Die
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.

● This directory of products lists for ready reference the names of manufacturers and dealers whose sales to Tool·Die·Machine PROGRESS readers have established them as dependable in every sense of the word. They merit your consideration.

● Complete information about any product may be had upon request made to the firm listed or to us.

● Your mention of Tool·Die·Machine PROGRESS will be appreciated.

CLAMPS—Toggle
Detroit Stamping Co., 3443 West Fort St., Detroit, Mich.
Knu-Vise Products Co., Inc., 6433 Cass Ave., Detroit, Michigan.

CONTOUR METAL-WORKING MACHINES
Continental Machine Specialties, 1301 S. Washington Ave., Minneapolis, Minn.

COUNTERBORES
Eclipse Counterbore Co., 7428 St. Aubin Ave., Detroit, Mich.
Putnam Tool Co., 2985 Charlevoix Ave., Detroit, Mich.

CRANKSHAFTS—Heat Treated for Presses
Enterprise Machine Parts Corp., 2731 Jerome Ave., Detroit, Mich.

CUT-OFF WHEELS
Carborundum Co., Niagara Falls, N. Y.

CUTTERS—Die-sinking
Eclipse Counterbore Co., 7428 St. Aubin Ave., Detroit, Mich.

CUTTERS—Milling
Putnam Tool Co., 2985 Charlevoix, Detroit, Mich.

CUTTERS—Multi Diameter
Eclipse Counterbore Co., 7428 St. Aubin Ave., Detroit, Mich.

CUTTING MACHINES—Hand & Power
Buffalo Forge Co., 477 Broadway, Buffalo, N. Y.

DE-MAGNETIZER
Arlavox Mfg. Co., 428 So. Green St., Chicago, Ill.

DIAMOND STONES
Carborundum Co., Niagara Falls, N. Y.

DIAMOND WHEELS
Carborundum Co., Niagara Falls, N. Y.

DIE CASTING MACHINES
Phoenix Machine Co., The, W. 28th and Church Sts., Cleveland, Ohio.
Reed-Prentice Corp., Worcester, Mass.

DIE MAKERS SUPPLIES
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
F. C. Danneman Co., 203-205 Lafayette St., New York, N. Y.
Die Supply Co., 2059 Hamilton Ave., Cleveland, Ohio.

DIE MAKING MACHINES
Continental Machine Specialties, Inc., 1301 Wash. Ave., Minneapolis, Minn.
Grob Brothers, Grafton, Wis.

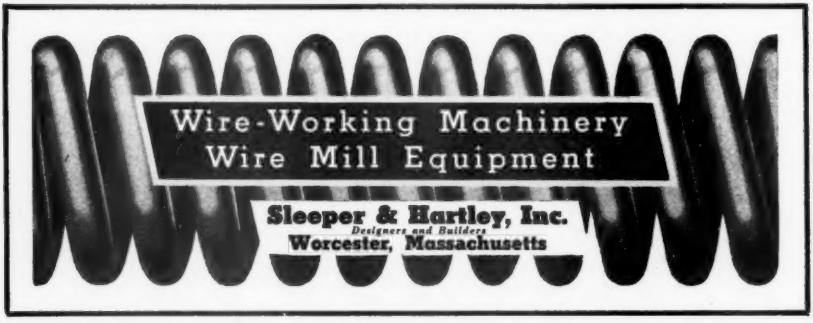
DIE SECTIONS—Composite Steel
Die Supply Co., 2059 Hamilton Ave., Cleveland, Ohio.
Forging and Casting Corp., Ferndale (Detroit), Michigan.

DIE SECTIONS—Forged
Ajax Steel and Forge Co., 205 Adair St., Detroit, Mich.

DIE SETS
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
F. C. Danneman Co., 203-205 Lafayette St., New York, N. Y.
Die Supply Co., 2059 Hamilton Ave., Cleveland, Ohio.

DIE SINKING MACHINES
Reed-Prentice Corp., Worcester, Mass.

DOWEL PINS
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Die Supply Co., 2059 Hamilton Ave., Cleveland, Ohio.



DRESSING STICKS
Carborundum Co., Niagara Falls, N. Y.
DRILLING MACHINES—Automatic
Sommer & Adams Co., The, 18511 Euclid Ave., Cleveland, Ohio.
DRILL JIG—Toggle Action
Knu-Vise Products Co., Inc., 6433 Cass Ave., Detroit, Michigan.
DRILL JIG—Universal
Hartford Special Machinery Co., Hartford, Conn.
DRILL JIG BUSHINGS
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.
DRILL PRESSES—Single & Multiple Spindle
Buffalo Forge Co., 477 Broadway, Buffalo, N. Y.
ELEVATING TABLES—Portable
Hamilton Tool Co., The, 223 North B Street, Hamilton, Ohio.
END MILLS
Progressive Tool & Cutter Co., Ferndale, Michigan.
Putnam Tool Co., 2985 Charlevoix, Detroit, Mich.
EXTRACTOR—Broken Tap
The Walton Co., 88 Allyn St., Hartford, Conn.
FILES—Hand
Grobet File Corp. of America, 3 Park Place, New York, N. Y.
FILES—Rotary
Grobet File Corp. of America, 3 Park Place, New York, N. Y.
Hamilton Tool Co., The, 222 North B Street, Hamilton, Ohio.
FILING MACHINES—Continuous
Continental Machine Specialties, Inc., 1303 Washington Ave., S., Minneapolis, Minn.
Grob Brothers, Grafton, Wis.
FORGINGS—General
Ajax Steel & Forge Co., 205 Adair St., Detroit, Mich.
FORGINGS—Water and Oil Hardening, High Speed, Special Alloy, Stainless and S.A.E. Steel
Forging and Casting Corp., Ferndale (Detroit), Michigan.
GAGES—Spring Stop
Knu-Vise Products Co., Inc., 6433 Cass Ave., Detroit, Michigan.
GAGE BLOCKS
Ford Motor Co., Johansson Div., Dearborn, Mich.
GEARS—Special—14 to 96 D.P.—Made to Order Only
Gear Specialties, Inc., 2640 W. Medill Ave., Chicago, Ill.
GRINDER—Portable Pneumatic
Onsrud Machine Works, Inc., 3914 Palmer St., Chicago, Ill.
GRINDER—Precision for Contours
Baker Brothers, Inc., Toledo, Ohio.
Boyar-Schultz Corp., 2114 Walnut Street, Chicago, Ill.
Koestlin Tool & Die Corp., 3601 Humboldt Ave., Detroit, Mich.
GRINDING & LAPPING — Precision
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.
GRINDING WHEELS
Carborundum Company, The, Niagara Falls, New York.
GUIDE PINS
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
HACK SAW SHARPENING
Machinists Tool Grinding Co., 2836 W. Lake St., Chicago, Ill.
HONING STICKS
Carborundum Co., Niagara Falls, N. Y.
JIG BORING—Contract
Riffer Tool & Die Co., 5601 Tillman Ave., Cleveland, Ohio.
Swiss Boring Co., 3916 Vermont Ave., Detroit, Mich.
JIG BORING TOOLS
Eclipse Counterbore Co., 7428 St. Aubin Ave., Detroit, Michigan.
LAPS—Copper Head Expansion
Boyar-Schultz, Inc., 2114 Walnut Street, Chicago, Ill.
LAPPING COMPOUND
Carborundum Co., Niagara Falls, N. Y.
LAPPING MACHINES
Schramm & Co., A. P., 3333 Payne Ave., Cleveland, Ohio.
LEADER PINS
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.
Die Supply Co., 2059 Hamilton Ave., Cleveland, Ohio.
MACHINE BASES—Fabricated
Die Supply Co., 2059 Hamilton Ave., Cleveland, Ohio.
MACHINE REBUILDING
Enterprise Machine Parts Corp., 2751 Jerome Avenue, Detroit, Mich.
MAGNETIC SINE TABLE
Omer E. Robbins Co., 637 Mt. Elliott Ave., Detroit, Mich.
MILLING MACHINES—Vertical
Reed-Prentice Corp., Worcester, Mass.
MILLING MACHINES—Continuous
Sommer & Adams Co., The, 18511 Euclid Ave., Cleveland, Ohio.
MOLDING MACHINES—Plastic
Reed-Prentice Corp., Worcester, Mass.
NUMBERING DEVICES
H. O. Bates, 251-257 North Broad St., Elizabeth, N. J.
PARALLELS
Ford Motor Co., Johansson Div., Dearborn, Mich.
POLISHING & BUFFING MACHINES—Automatic Continuous
Sommer & Adams Co., The, 18511 Euclid Ave., Cleveland Ohio.
POLISHING GRAIN—
Carborundum Co., Niagara Falls, N. Y.
PUNCHES—Hand, Toggle Action
Knu-Vise Products Co., Inc., 6433 Cass Ave., Detroit, Michigan.
PUNCHES—Standard & Interchangeable
Hovis Screwlock Co., 3129 Larned St., E., Detroit, Mich.
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Putnam Tool Co., 2985 Charlevoix Ave., Detroit, Mich.
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Royal Oak Tool & Machine Co., 621 E., Fourth Street, Detroit, Mich.

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Enterprise Machine Parts Corp., 2751 Jerome Ave., Detroit, Mich.

RETAINERS—Punch & Die
Hovis Screwlock Co., 3129 Larned St., E., Detroit, Mich.

RIVETING MACHINES
Buffalo Forge Co., 477 Broadway, Buffalo, N. Y.

ROLLER DIE FORMING MACHINES
McKinney Tool & Mfg. Co., The, 1688 Arabella Rd., Cleveland, Ohio.

SALVAGE—Tool-Die & Machine Parts
Master Chrome Service, Inc., 5611 Herman Ave., N.W., Cleveland, Ohio.

SAND BLASTING
Porter Steel Treating Co., The Geo. H., 1225 Marquette St., Cleveland, Ohio.

SAW & SHEAR CUT-OFF MACH.—Automatic
McKinney Tool & Mfg. Co., The, 1688 Arabella Rd., Cleveland, Ohio.

SAWING MACHINES—Continuous
Continental Machine Specialties, Inc., 1303 So. Washington St., Minneapolis, Minn.

SAWING MACHINES—Open End
Grob Brothers, Grafton, Wis.

SCREW MACHINE PRODUCTS—Contract
Star Machine & Tool Co., 9320 Woodland Ave., Cleveland, Ohio.
Ulmer Co., The J. C., 1701 East 38th St., Cleveland, Ohio.

SCREW MACHINE PRODUCTS—Hardened & Ground
Acme Industrial Co., 206 No. Laflin St., Chicago, Illinois.

SCREWS—Socket Head
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Die Supply Co., 2059 Hamilton Ave., Cleveland, Ohio.
Strong, Carlisle & Hammond Co., 1392 West Third St., Cleveland, Ohio.

SCREWS—Transfer
Nielsen Tool & Die Company, 1859 Gardner Ave., Berkley, Michigan.

SCRIBERS
Ford Motor Co., Johansson Div., Dearborn, Mich.

SHARPENING STONES
Carborundum Co., Niagara Falls, N. Y.

SHEARS—Bolt & Rivet—Automatic
Buffalo Forge Co., 477 Broadway, Buffalo, N. Y.

SINE BARS
Ford Motor Co., Johansson Div., Dearborn, Mich.

SPACERS—For Milling Machine Arbors
Detroit Stamping Co., 3443 West Fort St., Detroit, Mich.

SPACING FIXTURES
Hartford Special Machinery Co., Hartford, Conn.

SPRING MAKING MACHINERY
Sleeper & Hartley, Inc., Worcester, Massachusetts.

SPRINGS—Die
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Die Supply Co., 2059 Hamilton Ave., Cleveland, Ohio.

STAMPINGS
Barth Stamping & Mach. Works, W. 94th & Denison, Cleveland, Ohio.
Davis Tool & Engineering Co., 6481 Epworth Blvd., Detroit, Mich.
Denning Mfg. Co., The, 1775-81 E. 87th St., Cleveland, Ohio.
Detroit Stamping Co., 3443 West Fort St., Detroit, Mich.
Modern Tool & Die Co., P. O. Box 2741, Cleveland, Ohio.
Rockford Die & Tool Wks., Inc., 1816 Seventeenth St., Rockford, Ill.
Star Machine & Tool Co., 9320 Woodland Ave., Cleveland, Ohio.
Star Tool & Die Works, 2522 24th St., Detroit, Mich.
Ulmer Co., The J. C., 1701 East 38th
Variety Machine & Stamping Co., The, 12695 Elmwood Ave., Cleveland, Ohio.
St., Cleveland, Ohio.

STAMPS—Steel
H. O. Bates, 251-257 North Broad St., Elizabeth, N. J.

STEEL—Alloy
Columbia Tool Steel Co., 410 East 14th St., Chicago Heights, Ill.
Darwin & Milner, Inc., 1258-64 West Fourth Street, Cleveland, Ohio.
William Jessop & Sons, Inc., 121 Varick St., New York, N. Y.
Wheelock-Lovejoy & Co., Inc., 130 Sidney St., Cambridge, Mass.

STEEL—Carbon
Columbia Tool Steel Co., 410 East 14th St., Chicago Heights, Ill.
Darwin & Milner, Inc., 1258-64 West Fourth Street, Cleveland, Ohio.
William Jessop & Sons, Inc., 121 Varick St., New York, N. Y.

STEEL—Chromium
Darwin & Milner, Inc., 1258-64 West Fourth St., Cleveland Ohio.

STEEL—"Cobalt"
Darwin & Milner, Inc., 1258-64 West 4th St., Cleveland, Ohio.

STEEL—High Speed
Ajax Steel & Forge Co., 205 Adair St., Detroit, Mich.
Columbia Tool Steel Co., 410 East 14th Street, Chicago Heights, Ill.
Darwin & Milner, Inc., 1258-64 West 4th St., Cleveland, Ohio.
William Jessop & Sons, Inc., 121 Varick St., New York, N. Y.

STEEL—Stainless
Ajax Steel & Forge Co., 205 Adair St., Detroit, Mich.

STEEL—Tool & Die
Columbia Tool Steel Co., 410 E. 14th St., Chicago Heights, Ill.
Darwin & Milner, Inc., 1258-64 West 4th St., Cleveland, Ohio.
William Jessop & Sons, Inc., 121 Varick St., New York, N. Y.
Wheelock-Lovejoy & Co., Inc., 130 Sidney St., Cambridge, Mass.

STEEL PLATE—Ground
Die Supply Co., 2059 Hamilton Ave., Cleveland, Ohio.

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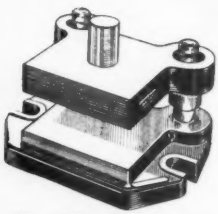
The Secrets of Danneman Die Set Performance are:

1. Precision bored on master plates
2. Precision assembled with cylinder squares

DANNEMAN *Precision* **DIE-SETS**



3 Classes of Die Sets to meet every requirement of die, product and cost.

Class A—Precision die sets assembled with precision lapped, hardened and ground long steel bushings.

Class B—Standard die sets assembled with hardened and ground standard length steel bushings.

Class C—Commercial die sets assembled with hardened and ground standard length steel bushings.

We will advise you conscientiously which class to use for most efficient Service at Lowest Cost.

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STEEL TREATING—Hardening
Porter Steel Treating Co., The Geo. H., 1235 Marquette St., Cleveland, Ohio.

STRAIGHT EDGES
Ford Motor Co., Johansson Div., Dearborn, Mass.

STRAIGHTENING MACHINES
Buffalo Forge Co., 477 Broadway, Buffalo. N. Y.

TAP EXTRACTOR
The Walton Co., 88 Allyn St., Hartford, Conn.

TAPPER—Precision
The Master Tapper Co., 2 Main St., Belleville, N. J.

TAPPING MACHINES
Buffalo Forge Co., 477 Broadway, Buffalo. N. Y.

TAPPING MACHINES—Tool Room
The Master Tapper Co., 2 Main St., Belleville, N. J.

TOOLS AND DIES—Carboloy
Kiffer Tool & Die Co., 6401 Tillman Ave., Cleveland, Ohio.

TOOLS—Cemented Carbide Tipped
Eclipse Counterbore Co., 7428 St. Aubin Ave., Detroit, Mich.

TOOL CHESTS
Gerstner Tool Chests, 56 Columbia St., Dayton, Ohio.

TRANSFER SCREWS
Nielsen Tool & Die Co., 1859 Gardner Avenue, Berkley, Michigan.

TRANSMISSION UNITS
Ohio Ball Bearing Co., 6581 Euclid Avenue, Cleveland Ohio.

TUBING—Tool Steel
Bissett Steel Co., The, 947 E. 67th St., Cleveland, Ohio.

TYPE HOLDER
H. O. Bates, 251-257 North Broad St., Elizabeth, N. J.

VENTILATING APPARATUS
Buffalo Forge Co., 477 Broadway, Buffalo, N. Y.

WASHERS—Special
Detroit Stamping Co., 3443 West Fort St., Detroit, Mich.

WELDING
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Overly-Hautz Co., 1617 West 116th St., Cleveland, Ohio.
Star Tool & Die Works, 3522 24th St., Detroit, Mich.

WELDING PLIERS
Knu-Vise Products Co., Inc., 6432 Cass Ave., Detroit, Michigan.

WIRE MILL EQUIPMENT
Sleeper & Hartley, Inc., Worcester, Massachusetts.

WIRE-WORKING MACHINERY
Sleeper & Hartley, Inc., Worcester, Massachusetts.

THRUST BEARINGS

for every type of machine and position of application.

All leading ball and roller thrust bearings, banded as shown or without band and using steel or bronze retainers. Also all types of ball and roller bearings and transmission equipment.

Special sizes made to your blue print
Any quantity

AKRON COLUMBUS **THE OHIO BALL BEARING CO.** CLEVELAND YOUNGSTOWN TOLEDO CINCINNATI

No Springs
No Gadgets
on
HOVIS PUNCH RETAINERS

The *Screwlock* method of retaining punches is simple but positive . . . Partial turn with socket wrench releases punch . . . *Perfect Interchangeability—Quickest Replacement.*

***NEW* HOVIS BUTTON DIES**

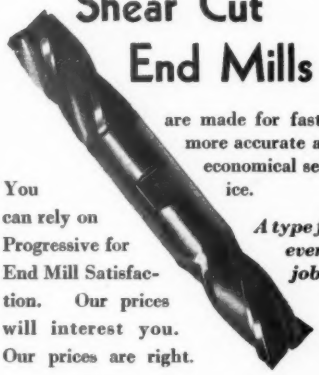
are made to use either as interchangeable or press fit types.

Group plates are readily made in any die shop by using Hovis Liner Bushings and Screwlocks.

Learn about the advantages of all Hovis products from new Catalog CL-3.

HOVIS SCREWLOCK CO.
3129 E. Larned St. Detroit, Mich.

PROGRESSIVE
Shear Cut End Mills



are made for faster, more accurate and economical service.

You can rely on Progressive for End Mill Satisfaction. Our prices will interest you. Our prices are right.

A type for every job.

Ask for catalog and prices

PROGRESSIVE TOOL & CUTTER CO.
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FERNDALE MICHIGAN

When you order or write about products described in TDM PROGRESS please mention the publication.

Save 3 Ways With

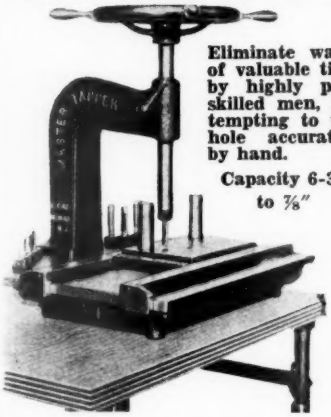
Mac-its

1. Switch to Mac-its for accurate fit, longer life.
2. Wherever ordinary screws break, strip or mushroom, use Mac-its to cut costs in the long run.
3. Design for compactness, for savings on material and production, by taking advantage of Mac-its' extra strength in smaller sizes.

Get details and prices from your Mac-it distributor, or write for Catalog 38.

The Strong, Carlisle & Hammond Co.
1392 West Third St. Cleveland, Ohio

Precision Tool Room Tapping
SAVES
TIME—TAPS—TROUBLE



Eliminate waste of valuable time by highly paid skilled men, attempting to tap hole accurately by hand.

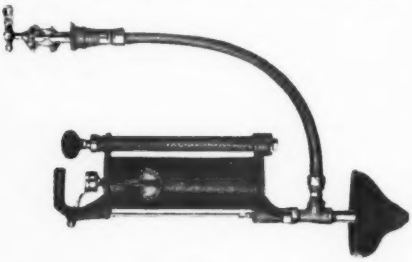
Capacity 6-32 to ⅞″

Send for circular

The Master Tapper Co.
2 Main St. Belleville, N. J.

Air Pressure Drain Cleaner

A HAND operated pressure pump designed for drains up to a six-inch soil line, that should be a very useful



accessory for the shop or tool room, has just been introduced by the Empire State Drain Cleaner Corporation

The air pressure is generated by a hand-operated side pump and is released from the compression chamber by means of a trigger connection The pressure thus released acts as a hammer blow against the obstruction, removing it instantly without any possible injury to pipes or drains.

The variable adaptor supplied with the Empire State Drain Cleaner makes it readily suited for any sort of emergency, reducing maintenance costs and avoiding unnecessary expense, inconvenience and delay.

The Empire State Drain Cleaner is made by the Empire State Drain Cleaner Corporation, Empire State Building, New York City. Ask for Circular P-1.

THE GEO. H. PORTER STEEL TREATING CO.

Tool Work Our Specialty

- *Heat Treating*
- *Annealing*
- *Carburizing*
- *Case Hardening*
- *Sand Blasting*

1225 Marquette St. Tel. HEnderson 6601 Cleveland, Ohio

Write or phone for our copyrighted Hardness Conversion Chart

When you order or write about products described in TDM PROGRESS please mention the publication.

New Saw Blade Butt Welder Is Entirely Automatic

SAW blade clamps of an entirely new design to permit positive and accurate line-up of the saw blades are a feature of the Type BW Grob Butt Welder. The saw guides are adjusted so the teeth of the saw blades are outside of the clamp which holds only the flat part of the blade. The clamps are provided with an eccentric connected with a small lever, the clamps automatically adjust themselves to various thicknesses of saw blades.

The actual welding is entirely automatic—any operator by following the simple directions on the nameplate can do a first-class job of welding the first time he uses the machine. Each switch is designed with a quick, snap action, insuring extra long life. The switches are mechanically and electrically interlocked so that no damage can result from any error in operation. The welding can be performed rapidly and the saw is ready to resume work. This saving in time and labor of the operator soon pays for the welder.

After the saw blade has been welded and annealed, it is removed from the clamps ready for grinding. The grinder is a built-in unit, the guarded Bakelite wheel being driven by a high grade ball bearing motor. The grinder quickly removes the welding flash.

Saw blades from $\frac{1}{16}$" to $\frac{1}{2}$" widths can be welded with the BW Grob Butt Welder.

The butt welder is small, compact and is furnished with or without a handy portable stand.

Grob Brothers, an established manufacturer of die making machines, state that the BW Butt Welder is easily portable to the job and that one butt welder will take care of an entire battery of saw machines. The overall dimensions are 12" high, 8" wide and 8¼" deep. The shipping weight is 58 pounds.

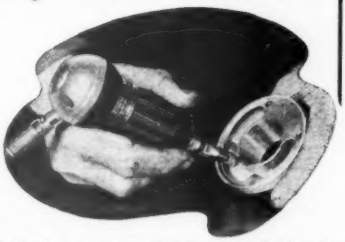
The BW Grob Butt Welder will be exhibited at the Machine and Tool Progress Exhibition, Convention Hall, March 14-18, Detroit, Mich.

For full information on the new Grob Electric Butt Welder, Type BW, write Grob Brothers, Grafton, Wisconsin. Ask for Sheets P-3.

Save Money and Grinding Time . . . with this

B-1 GRINDER

Air Turbine Drive, High Efficiency —75,000 RPM, ⅛ H.P., yet weighs less than 1 lb. Grinds hardened die steel rapidly. Automatic lubrication. Runs at less than room temperature. Economic operation. *Write for descriptive bulletin and free trial offer.*



ONSRUD MACHINE WORKS, Inc., 3914 Palmer St., Chicago, Illinois

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Tool · Die · Machine CONTRACT SHOPS

Among these shops will be found modern facilities for building every kind of Special Tool, Die and Machine. Some are equipped for small and medium size work, others for large. Some do Designing and Engineering, Development and Experimental Work and build Models; others are equipped for production of Precision Specialties of every description. Still others operate Machine Production plants and manufacture Parts, Stampings and Complete Assemblies. All will appreciate the opportunity to submit estimates.

Detroit, Michigan

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TOOLS and DIES
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Sheet Metal
Stampings and Assemblies

ENTERPRISE MACHINE PARTS CORP.
Jerome Ave. at McNichols Rd. E. TOwnsend 8-9643
PRODUCTION MACHINE REPAIR PARTS
Motor Drives, Gears, Worms, Tools, Fixtures
Machine Overhaul Specialists

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Manufacturers
Sheet Metal Dies "Grindrite" Die Grinders

***LINCOLN TOOL & DIE COMPANY**
950 West Fort Street CHerry 0733
TOOLS—DIES—JIGS—FIXTURES
Special Machinery *Precision Grinding*

MAJESTIC TOOL & MFG. COMPANY
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Manufacturers
General line of Tool and Die Work, Tool Details, Parker High Speed Grinding Spindles

NORTHEASTERN ENGINEERING CO.
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Specialists in the Designing and Building of Progressive Dies
Dies—Tools—Special Machinery

ROBBINS ENGINEERING COMPANY
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Designers and Manufacturers
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ROYAL OAK TOOL & MACHINE CO.
621 E. Fourth St., Royal Oak, Mich. ELmhurst 6580
Manufacturers of
Tools, Dies, Jigs, Fixtures. Special Machinery and Designing. Hoch Self-Centering Cylinder Reamers

STAR TOOL & DIE WORKS
2522-24th St. LAfayette 1716
BUILDERS of DIES
Facilities for the Largest
MANUFACTURERS
of STAMPINGS

Cleveland, Ohio

BARTH STAMPING & MACH. WORKS
W. 34 & DENISON SHa. 1857
DIES—TOOLS—JIGS—MOLDS
GLENN A. BARTH THOM. A. BARTH
J. A. BARTH J. J. BARTH

***THE BUNELL MACHINE & TOOL CO.**
1620 East 24th St. PRospect 2681
JIGS—FIXTURES—GAGES—MODELS
Blanking, Forming, Drawing, Piercing
Trimming, Bending and Coining Dies
Special Tools and Machinery

CLEVELAND UNIVERSAL JIG COMPANY
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Designers and Builders
Jigs & Fixtures Special Machines
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COMPLETE PLANT
ROUTING and TOOLING

*See larger display advertisement also.

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1775-81 East 87th St. CEdar 0801
Designers and Builders
HIGH GRADE DIES

HAHN MANUFACTURING COMPANY
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Modern equipped shop for building of
MEDIUM AND LARGE
DIES, TOOLS, SPECIAL MACHINERY
Equipment includes:
3" and 5" spindle Horizontal Boring Mills
Large planers Vertical Mill

THE INDUSTRIAL MACHINE CO.
1436 East 47th Street Founded in 1903
Builders of Special Machinery
GENERAL MACHINE WORK

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Manufacturers Special Machinery
Tools, Dies, Jigs, Fixtures, Tungsten Carbide Tools
SWISS JIG BORING

***THE McKINNEY TOOL & MFG. CO.**
1688 Arabella Rd. KEnmore 1681
Roller Die Forming Machines
Automatic Saw and Shear Cut-off Machines
Special Machinery—Dies, Jigs, and Fixtures
Jig Boring—Precision Machine Parts

MODERN TOOL & DIE CO.
P. O. Box 2741
West Park Branch CLearwater 6410
DESIGNERS AND BUILDERS
Tools and Dies *Special Machinery*
STAMPINGS

OHIO TOOL COMPANY
3160 West 106th St. CLearwater 3200
Designers and Builders
SHEET METAL DIES, TOOLS, SPECIAL MACHINERY, DIE CASTING DIES
RUBBER MOULDS
●
Modern Facilities
150-Man Shop

THE PARAMOUNT TOOL CO.
1392-98 East 43rd St. ENdicott 2220
JIGS, FIXTURES, DIES
Experimental Work

***See larger display advertisement also.**

***The PHOENIX MACHINE COMPANY**
W. 28th and Church Sts. CHerry 1048
PLANERS
42" by 14 ft. long
24" by 6 ft. long
Let us figure

A. P. SCHRANER & COMPANY
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EXTERNAL CYLINDRICAL
LAPPING MACHINES
Special Machinery
TOOLS, DIES, JIGS, FIXTURES

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DESIGNERS AND BUILDERS
Special Machinery
TOOLS, JIGS and FIXTURES

STAR MACHINE & TOOL CO.
Established 1903
9320 Woodland Ave. GArfield 2060
DIES - JIGS - FIXTURES
Special Machines
JIG BORING with
Pratt & Whitney Precision Equipment
NEW OPENSIDE PLANER EQUIPMENT
12 ft. x 48" Capacity

TOOLS & GAGES, Inc.
4106 East 63d St. MIchigan 7230
"Let us be your tool room."
DESIGNERS AND BUILDERS
Tools, Gages, Dies, Jigs, Fixtures
Special Machinery
SWISS JIG BORING
DIE CASTING DIES

THE J. C. ULMER COMPANY
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Tools, Dies, Jigs, Fixtures
Special Machinery *Designing and Building*
Experimental, Model, Punch Press and
Screw Machine Work

THE VARIETY MACHINE & STAMPING COMPANY
12698 Elmwood Ave. LAkewood 8433
Designers and Manufacturers
Dies, Metal Stampings 250 tons capacity

Hamilton, Ohio

***THE HAMILTON TOOL COMPANY**
220-222 North B Street
Designers and Builders of
Tools, Dies, Jigs, Fixtures, Special Machinery
The Hamilton Portable Elevating Table

When you order or write about products described in TDM PROGRESS please mention the publication.

H. O. BATES

TOUGH

NUMBERING MACHINES
MARKING MACHINES
STAMPS & DIES

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MARKING PROBLEMS INVITED

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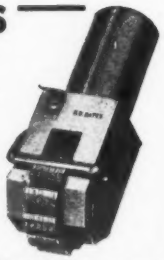
SEND FOR LATEST CATALOG



H. O. BATES, MARKING DEVICES
251-257 North Broad Street
ELIZABETH, N. J.

HAVE YOUR DIES WELDED
BY THE ATOMIC - HYDROGEN PROCESS

- Welding of Jigs and Fixtures
- Repairing and Refacing of Dies and Moulds
- Welding Broken Machine Parts
- Stellite or Alloy Facing of Wearing Parts
- Mishaps and Errors Corrected

ALL DIE WELDING DONE WITH STEEL OF SAME ANALYSIS AS YOUR DIE

THE OVERLY-HAUTZ CO.
1617 West 116th St. LAkewood 3640
Cleveland, Ohio

HANDY RACKS

Four times the capacity in convenient floor and height space. Widely used in tool steel factories, warehouses, large and small shops. Very small cost—no crating required.

30 day approval. Send for circular.

WM. S. YOHE SUPPLY COMPANY
500 Mahoning Rd., Canton, O.

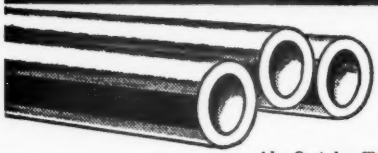
New Broaching and Machining Lubricant Saves 400%

A NEW compound, known as Aqua Sol "C" Compound, especially adapted for use in broaching on both vertical and horizontal machines, and for lathes and other machines where a good machining lubricant is required, has just appeared on the market.

The average solution of Aqua Sol "C" is a mixture of eight to ten parts of water to one part of the compound. Because so small an amount is required to produce an effective solution, actual tests have shown that savings of 25% to 400% on lubrication costs are being effected in the shops now using this compound. Being water soluble, it is much more efficient for cooling purposes than oil lubrication. A better finish is secured on the parts being broached or machined.

For further information and prices write Wayne Chemical Products Company, Department TD5, Detroit, Michigan.

OIL HARDENING TOOL STEEL TUBING



Substantially reduces labor costs by eliminating the expensive procedure of drilling from the solid.

BISCO TOOL STEEL TUBING is a fine grade tool steel in tubular form available in sizes up to 14" diameter and 2" wall thickness; other sizes to your specification.

THE BISSETT STEEL COMPANY
947 E. 67th St., Cleveland, Ohio
1036 W. Lake St., Chicago, Ill. 367 Main St., Buffalo, N.Y.

Also Stainless Tubes, Mechanical Tubes, Aircraft Tubes, Pressure Tubes.

Have YOU Thrown $100.00 in Your Scrap Heap?

One customer of ours, who formerly threw away his dull hack saw blades, reclaimed $100 worth of blades from his scrap heap. Why discard dull power hack saw blades? *Dull blades sharpened* over and over again at the *low cost of 2½¢ per inch* (12 blades or more).

Machinists Tool Grinding Co. 2836 W. Lake St. Chicago, Illinois

When you order or write about products described in TDM PROGRESS please mention the publication.

Jessop's Sheffield Quality Tool Steels

Over 5 Generations of Service—1774-1939

A renowned Tool Steel every user knows.

Write for your Free Copy, Bulletin Tool Steel facts.

WILLIAM JESSOP & SONS, Inc.

CHICAGO 2706 W. Van Buren St. | NEW YORK 121 Varick St. | BOSTON 163 High St.

Low Cost D. C. POWER

for Magnetic Chucks, Electric Motors and Equipment

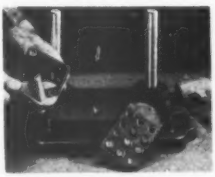
ARLAVOX Rectifiers convert A.C. to D.C. by simply plugging into an ordinary 110 volt A.C. socket ... No moving parts ... Give years of trouble-free, inexpensive service ... Low first cost.

Circular on request.

ARLAVOX MFG. COMPANY
428 South Green St. Chicago, Illinois

NIELSEN TRANSFER SCREWS

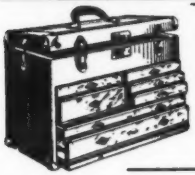
Locate drill holes perfectly and quickly



Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time of other methods and eliminate spoilage.

7 Sizes · Inexpensive · Last for years · *Write for circular*

NIELSEN TOOL & DIE COMPANY
1859 Gardner Avenue Berkley, Michigan



Help Your Men to Help You! • • •

When you encourage your machinists, tool, die and pattern makers to care for their good tools in a *Gerstner* High Grade Tool Chest, you will be repaid with increased output and with a better quality of work. . . . *Help the men choose their chest from Free Catalog.*

Gerstner Tool Chests • 56 Columbia Street Dayton, Ohio

We Can Do It!

Behind our acceptance of any job is the experience necessary for better design—there is an adequate, balanced plant where precision building at the lowest sound price is an established practice.

We Design and Build —

Special Tools, Jigs, Dies, Gages, Special Machines

Carboloy Tools and Dies

of all types designed and built

We do experimental work

May we quote you on your requirements?

KIFFER TOOL & DIE CO.

Successor to Lyons Machine Co.

5601 Tillman Ave. Cleveland, O.
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SWISS FILES

★ GROBET SWISS FILES have won a reputation for supremacy wherever exact and precise work must be done with files.

Ask for our catalog YN, the most complete of its kind, showing more than 4,000 different shapes, sizes and cuts of precision files, also files for filing machines, rotary files, etc.

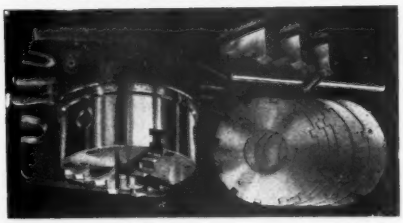
GROBET FILE CORP. OF AMERICA

3 Park Place New York City

When you order or write about products described in TDM PROGRESS please mention the publication.

Compare the stock machined with KENNAMETAL (above left) with that machined with high speed steel (above right). The fine quality of work produced so economically by KENNAMETAL-tipped tools explains the steady stream of repeat orders for this new intermetallic compound. KENNAMETAL will machine steel heat-treated up to 500 Brinell, *while combining roughing and finishing in one operation*, yet it has properties which make it readily adaptable for machining softer metals as well. Available in 18 standard tool styles (Style 11 illustrated above) or you can easily braze your own tools using KENNAMETAL blanks. No. 2 catalog gives detailed instructions.

McKENNA METALS Co.
500 LLOYD AVENUE
LATROBE, PENNSYLVANIA, U.S.A.



rigidly accurate
MACHINE CONTROL

The Hartford SUPER-SPACER: Modern device for errorless indexing in modern high-speed milling, drilling, grinding, slotting, planing. Built expressly for heavy machine cuts. A time-saver for small lots or in large production.

Write for circular CL-2 describing this modern device

THE HARTFORD
SPECIAL MACHINERY CO.
HARTFORD, CONNECTICUT

WANTED: A machine tool or precision specialty to manufacture. Will take over a meritorious product, partially or wholly developed, or will manufacture on some other mutually satisfactory basis.
Will buy or assist with development of any product which can be manufactured advantageously in a modernly equipped tool and machine shop. Write Tool Shop, % Tool-Die-Machine PROGRESS, 311 Fairmount-Cedar Building, Cleveland, Ohio.

Steel Marking Formula

A STEEL marking formula reported in "The Do-All Digest," the house organ of Continental Machine Specialties, Inc., and credited to the Glenn L. Martin Aircraft Company, is of interest to tool and die shop men. The formula which follows makes one gallon of marking fluid. Dissolve one level tablespoonful of Aniline Violet Merck (Gentian Violet B) in a small quantity of white denatured alcohol; add this to ⅓ gallon white shellac and ⅔ gallon white denatured alcohol.

64 Tests for South Bend Lathes

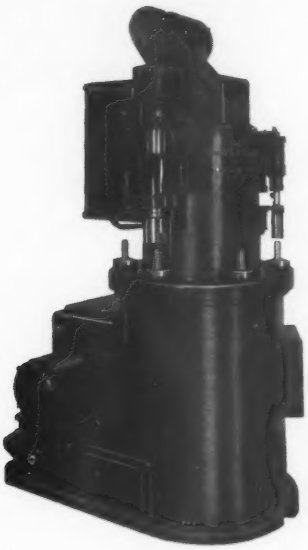
A NEW catalog announcing the new model 9" Workshop Precision Lathe now available in eight different types and in 3 to 4½ foot bed lengths has been published by the South Bend Lathe Works.

Sixty-four major tests for accuracy are described and illustrated in the new catalog. A total of 38 attachments for milling, grinding, turret, gear cutting, drawn-in collet, taper and many other jobs are available.

Some leading features are: Acme thread precision lead screw; alloy steel headstock spindle with ¾" hole providing ½" collet capacity; back-geared headstock with six spindle speeds and ball bearing thrust for the spindle; improved felt wick oiling system; machine cut steel gears from solid blanks; twin gear reverse on headstock for right and left hand threads and feeds.

For a copy of catalog No. 46-B giving full specifications and other data on the new Model 9" Precision Workshop Lathe, write the South Bend Lathe Works, South Bend, Indiana.

ANOTHER CASE RECORD...



This special machine was designed and built by us for a large production manufacturer. It assembles bearing rollers into special retainers and locks them in position by rolling over the edges of the retainers.

This machine like many others we have illustrated here, indicates convincingly the versatility of our organization and our manufacturing facilities.

We are builders of the well-known S & A Automatic Machines for Continuous Milling, Drilling and Polishing.

Production manufacturers are invited to write us for particulars about efficient installations we have made.

Jigs, Fixtures, Tools, Gauges and Production Specialties accurately designed. economically built.

THE SOMMER & ADAMS COMPANY

18511 Euclid Avenue — Cleveland, Ohio

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LIFE-SAVERS TO INDUSTRY

Master Chrome Plating is being used successfully on these products:

Dies for drawing brass, copper, steel, wire and for stamping out sheet metal parts

Hot forging dies

Electrical porcelain dies

Cams and gears

Crankshafts

Machine tool lead screws

Pneumatic tools

Piston rods for locomotives, pumps, compressors

Piston rods for gas, oil and steam engines

Rollers for roll type suction boxes

Table rolls for paper mills

Textile printing rollers

Hosiery knitting needles

Equipment for rayon mills, doling sleeves, falle wires, drop wires, tensions and guides

Glass bottle molds

Thread gauges

Meter parts

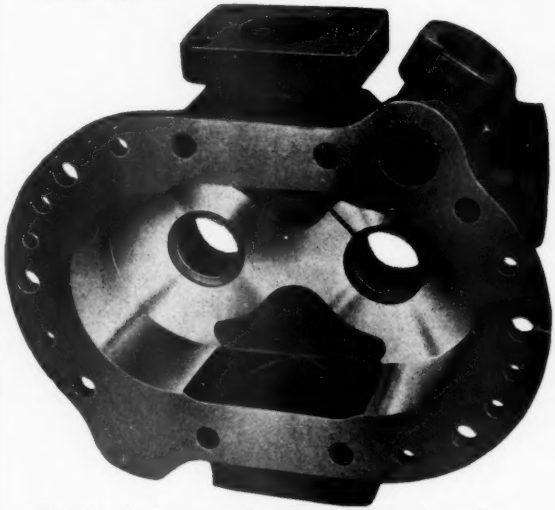
Canning machinery parts and other parts to resist wear and corrosion.

Catalogs, Case Records and Prices on Request

MASTER CHROME PLATING

Corrects Machining Errors

When inspection reveals that a product, tool, die or machine part has been machined under- or oversize, the unfailing correction to be made at minimum cost is a plating with Master Hard Chrome—1/1000 to ⅛" can be applied.



This intricate pump chamber, machined oversize, was saved by plating with .012" hard chrome

MASTER CHROME SERVICES

Include Tool Salvaging, Modernizing

The Master method of re-cutting tools—milling cutters, end mills, reamers, drills, etc.—without annealing is a secret process protected by patent. Exact hardness and structure of steel are retained. Tools are finished to manufacturer's standard specifications of tooth depth—workmanship is guaranteed.

Tool Modernization frequently is possible at a cost considerably less than new tools. We make a specialty of adapting obsolete tools to latest and most improved designs.

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